INTERNATIONAL JOURNAL OF
RECENT TRENDS IN MULTIDISCIPLINARY RESEARCH
Special Issue, March-April 2023, Vol 3 (02), 81-82.
International conference on Innovation towards Sustainable Development Goals-ICISDG'23 ISSN No: 2583 0368

Design & Fabrication of Electro Magnetic Clutch System for Four-Wheeler

Lingeswaran P[1], Nagaraj J[2]
[1,2]*Mechanical Engineering, Sri Venkateshwara Hi-Tech Engineering College Gobi,TamilNadu,India.*

Article Type: Research

OPENACCESS
Article Citation:
Lingeswaran P[1], Nagaraj J[2] ,"Design & Fabrication Of Electro Magnetic Clutch System For Four-Wheeler", International Journal of Recent Trends In Multidisciplinary Research, March-April 2023, Vol 3(02), 81-82.

https://www.doi.org/10.59256/ijrtmr.20230402c17

Abstract: The aim of the project is to Electro Magnetic Clutch System for Four-Wheeler. The hand operated clutch is operated by motor power. Here we are using for DC motor. The motor is connected with the belt. Due to continuous power supply the motor runs. The clutch employed here is electromagnetic clutch (EMC). A switch is provided on the gear lever. Whenever the switch is pressed to shift the gear, that makes the clutch to operate. The driver circuit is constructed with transistor which acts as switch to control the relay. The relay output is directly connected to the electromagnetic clutch which engages the clutch. The objective of the project is to develop a hand operated clutch system which can be useful for handicapped persons while driving the four wheelers. This project is mainly used in Vehicles either two or four wheelers. If this project is used in real time, we can avoid so many accidents.

Key Word: Electromagnetic Clutch, DC Motor, Micro Controller.

1. Introduction

The objective of the project is to develop a hand operated clutch system which can be useful for handicapped persons while driving the four wheelers. This project is mainly used in Vehicles either two or four wheelers. If this project is used in real time we can avoid so many accidents

2. Materials and Methods

Electro Magnetic Clutch

Electromagnetic clutches operate electrically but transmit torque mechanically. This is why they used to be referred to as electro-mechanical clutches. Over the years, EM became known as electromagnet

Brake

•A brake is a mechanical device which retards motion.
•Brakes use friction between two surfaces to convert the kinetic energy of the moving object into heat

L Shaped Rod

L-shaped rod is a combination of two rods. Let the origin of the planar coordinate system coincides with the corner of the L-shaped rod. com of a uniform rod is the middle point of the rod

Wheel

Depending on the type, your bicycle has either fat tires or thin tires. Most road bikes and touring bikes have thinner tires, while mountain bikes have big fat tires. Each type of tire has been adapted for the surfaces they ride on. The road tires are inflated to 100 or even 120 PSI (pounds per square inch).

Fly Wheel

A flywheel is a fairly heavy steel wheel that is attached to the rear end of the crankshaft. • The size of the flywheel is depended upon the number of cylinders and the construction of the engine.

DC Motor

When electrical power is applied to an electromagnet coil a magnetic field is created. The magnetic force is strong

enough to deflect the flat spring and pull the armature across a small air gap into the magnet face. The friction connection between the magnet and armature causes the rotating shaft to slow and stop.

Chain Plate

The chains are used on modern motorcycles, especially the ones with higher speeds. These chains are self-lubricating so they can go longer without lubrication and the operating noise is lower. They also wear less on the inside as unlike standard chains, they are lubricated between the plates

Work Flow

Frame will be designed For required shape Then motor and clutch plate is Assembled in frame Clutch Plate will be fixed in the frame And wheel will be connected in between Clutch Plate and motor Finally Electromagnetic Clutch System Finished

Working Principle

- The hand operated clutch is operated by motor power. Here we are using for DC motor.
- The motor is connected with the belt. Due to continuous power supply the motor runs.
- The clutch employed here is electromagnetic clutch (EMC). A switch is provided on the gear lever. Whenever the switch is pressed to shift the gear, that makes the clutch to operate.
- The driver circuit is constructed with transistor which acts as switch to control the relay. The relay output is directly connected to the electromagnetic clutch which engages the clutch

Advantages

- The Complicated linkage is not required to control clutch.
- Economical.
- Safe.
- Electromagnetic care performance is good

Disadvantages

- High Initial Cost.
- Operating Temperature is limited Because at high-Temperature insulation of the electromagnet gets damaged.
- The risk of the Overheating during the engagement.
- The brushes used to energize coils are needed a periodic check.

Applications

- It is applicable in all four wheelers and heavy vehicle.
- It can be used for the physically handicapped persons.
- Electromagnetic clutches are used in conveyor drives, Copy machines, and lawnmowers.
- It was used in the packaging machinery, Food processing machinery, and factory automation.

3. Comparison

Electromagnetic simulation in EMS coupled with motion in SW helps engineers to know all the aspect of an electromagnetic clutch.

Moreover, a thermal coupling in EMS also, can provides more necessary information which can be taken to dimension this machine. Hence, in addition of being fully integrated in Solid Works and Inventor, EMS is also accurate and easy to use.

References

1. *A. P. Tsybul'nik, hydraulic friction clutch for centrifuge drive. ? Control and Instruments in chemical Industry", Proc of ELSEVIER, 14 July 2015, pp43-45.*
2. *Francesco Bucchi, Paola Forte & Francesco Frendo Bingli Zhang, Qing liang Hou?Temperature, Effect on the Torque Characteristic of a Magneto rheological Clutch", Proc of ELSEVIER, IntellIndSyst, 2015, pp23-26.*
3. *FeiMenga,n, HuiyanChen b,TaoZhang c,XiaoyuanZhu ,?Control of an automatic transmission for heavy-duty vehicle applications, Mechatron", Proc of ELSEVIER, 24 April 2015, pp564–573.*
4. *Gao, B., Chen,H.,Liu,Q.,andChu,H. ?Position control of electric clutch actuator using a triple-step nonlinear method". Proc. Inst. Mech. Eng. Part D: J.Automobile. Eng, Proc of ELSEVIER, 2014,pp226(11), 1472–1482.*
5. *Kirchengast, M., Steinberger,M,?Modeling and feedback linearization based control of an electromagnetic clutchactuator?,Proc of ELSEVIER, vol. 15, no. 2,2014,pp 116–121.Paper ID: ART2019404310.21275/ART2019404373.*